THE

HOME FRIEND;

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A FEW WORDS ON THE MUSHROOM TRIBE.

BOLETUS EDULIS AND AGARICUS PROCERUS.

I NEVER make any lengthened stay in a house in the country, without feeling how great are the advantages of leisure which such a home affords. In farmhouses certainly, as well as in some others, the household are mostly occupied from morning till evening. In many country dwellings, however, there seems, from the absence of interruptions, from the early hours, the

quiet and the sunshine, a kind of holiday life, which is soothing and delightful to those whose ordinary home is amid the cares, and business, and visitings, and distractions of a city. But if such a home is to be made favourable either to improvement or enjoyment, the long hours of leisure must be well employed. A great physiologist has told us how often in the upper and middle classes of society the health and spirits suffer and are finally lost for want of some pursuit, some object in life which may be earnestly followed. He has told that nervous and other maladies beset some whose chief business in the day is to complete the netting of a purse; and we, when looking at the performances of young ladies in Berlin wool, have, sometimes, as the rich crimson tint met the eye, thought of the playful remark of one who said that such embroideries were stained with the blood of murdered Time. We would not depreciate these feminine pursuits, they are truly valuable as means of recreation; and we have sometimes smiled at hearing some of the other sex undervalue them, when we have known that these works of art have been wrought during the very hours in which they themselves were doing nothing. Women can happily work while they converse, and thus Time, precious Time, may often be well occupied in these things. But all earnest thoughtful persons need something higher than this to interest them—something which demands greater thought, and has a more important purpose. Most of all do those who live in the country need it, for they are deprived of those various means of intellectual activity which, even in a provincial town, are in constant operation, and which, by gathering many intelligent persons together, aid materially in mental improvement.

To those who live in the country, we would most earnestly recommend the study of some department of natural history. Trees are waving, flowers are blooming, birds are singing, and insects are revelling around them. The very pebbles in their pathway have a history of the past within them; the stream which is flowing by them has its shell-fish and zoophytes most wonderfully adapted to their element, most singularly constructed for life and nutrition. God made them all, and pronounced them good, and we need only to examine them to find how worthy they are of the praise of the Creator.

There is something very soothing to the mind in the study of nature, and so happily does it influence the thoughts, that Priest declares, that in all his extensive practice among the insane, he never met with one who was a naturalist. There are many branches of natural history, too, which immediately affect our physical comfort and welfare, and may be made subservient to domestic uses. A good botanist could point out to the poor in his neighbourhood, many roots and other portions of various plants, which could be used during a season of scarcity; and might dissuade from the medicinal uses of some of those "simples," administered in villages, which are positively hurtful, and often highly dangerous to the invalid when given without an accurate knowledge of disease. Southey mentions that his aunt, Miss Tyler, once effected a wholesome and curious innovation in the poor-house, by persuading the inmates to use beds stuffed with beech-leaves, according to a practice in some parts of France; and whatever may be the knowledge which we gain for ourselves, we may, if benevolently disposed, render it available to the good of others.

Any one who had leisure to bestow a careful and patient attention on the plants of the mushroom tribe, might find in these wonderful and beautiful objects a great source of interest, and might also be serviceable to the

neighbourhood in which he resided by imparting his knowledge. Owing to the ignorance and prejudice which at present prevail in this country respecting this tribe of plants, an immense amount of food is annually wasted, and a large source of employment is lost to the poor. Dr. Badham, in his valuable work on the Esculent Funguses of Britain, remarks, "I have this autumn, myself, witnessed whole hundredweights of rich wholesome diet rotting under trees; woods teeming with food, and not one hand to gather it; and this perhaps, in the midst of potato blights, poverty, and all manner of privations, and public prayers against imminent famine. I have indeed grieved when I have considered the straitened condition of the lower orders this year, to see pounds innumerable of extempore beefsteaks growing on our oaks in the shape of Fistulina hepatica; Agaricus fusipes to pickle in clusters under them; Puff-balls, which some of our friends have not inaptly compared to sweet-bread, for the rich delicacy of their unassisted flavour; Hydna as good as oysters, which they somewhat resemble in taste; Agaricus deliciosus, reminding us of tender lamb-

Fistulina Hepatica.

Agaricus Deliciosus.

Agaricus Orcella.

kidney; the beautiful Yellow Chanterelle, that *kalon Kagothon* of diet, growing by the bushel, and no basket but our own to pick up a few specimens in our way; the sweet nutty-flavoured Boletus, in vain calling himself edulis, where there was none to believe him; the dainty Orcella, the Agaricus heterophyllus, which tastes like the craw-fish when grilled; the red and green species of Agaricus to cook in any way, and equally good in all."

The reader unacquainted with the subject will be surprised to learn the value of funguses as a marketable commodity in some of the countries of

Europe. In Rome alone, so great is the consumption of this kind of vegetable diet, that not less than 140,000 pounds weight are annually used there as food, and their worth is estimated at 4,000*l.* sterling, and this in a population of 156,000 persons. The funguses of Great Britain are not less fitted for diet than those of Italy, and Dr. Badham thinks it likely that no country is richer than our own in esculent species, upwards of thirty of these abounding in our woods. Were they eaten as they might be, we might indeed with Mons. Roques, call them "the manna of the poor."

In Rome, an officer appointed by the government is called the Inspector of the Funguses, and it is his business to examine all those brought into the city from its vicinity. He is also empowered to fine or imprison any mushroom-gatherer who refuses to submit his plants to his inspection. Not only is it his duty to see that the plants are of wholesome species, but if he detects any stale mushrooms in the baskets, he immediately orders them to be thrown into the Tiber, their freshness being an important condition of their wholesomeness.

But our readers will say that Toadstools and various noxious kinds of fungus, are so similar to the edible mushrooms, as to render any ignorance in the matter highly dangerous in using them. We are not urging a slight acquaintance with the tribe, but a careful study of them: still the idea of danger connected with them is greatly exaggerated. In the immense majority of cases our mushroom plants are harmless. "The innoxious and esculent kinds," says Dr. Badham, "are the rule; the poisonous, the exception to it." "We take," he says, "our potatoes for the table out of the deadly family of the Solana; we select the garden from the fool's parsley; and we do not hesitate to pickle gherkins, notwithstanding their affinity to the squirting cucumber, which would poison us if we were to eat it." The eatable species are all clearly described, and in the work to which we refer, are also so well figured, as that they may be distinctly recognised. Nor is it a little remarkable that that frequent species of the fungus tribe, the common mushroom (*Agaricus campestris*), the Pratiola of the Italians, which we fearlessly purchase from the villager for ketchup, and other culinary uses, is almost the only one condemned by the Roman Inspector to be thrown into the Tiber. Here every woman in the village would think herself competent to decide on the species; "whilst," says our author, "many hundred baskets of what we call toad-stools are carried home for the table, this species is held in such dread, that no one knowingly will touch it. 'It is reckoned one of their fiercest imprecations,' writes Professor Sanguinetti, 'amongst our lower orders, infamous for the horrible nature of their oaths, to pray that one may die of a Pratiola.'" Yet in our country, notwithstanding its general use, an accident rarely occurs from any mistake in the species, notwithstanding its variety of form and general appearance; and far less discrimination would be required to identify several other species than this; for many are so obviously different from all others, that it would be impossible to confound one with another.

The exquisite beauty both of form and colour exhibited by some of the larger mushrooms might, independently of any other consideration, render this tribe worthy our attention. Some of them have hues like those of the peacock's tail, others are of richest violet, or most delicate lilac, or green, or yellow, or orange, or scarlet, or buff, or white, and polished as the finest ivory. And what delightful scenes and tones of nature present themselves to those who walk abroad, with eye and heart open to its influences, and with an ear awakened to its rich and varied melodies! What music is whispered

AGARICUS CAMPESTRIS.

by leaves and streams in field or wood! what vistas of beauty lie among the far-off purple hills! how many wild flowers give us their odours, and bend to the wind in attitudes of grace, and preach a lesson to the heart, of the care of Him who formed them! The very toad-stools, as we call them, have colours richer even than those of the flowers, and we need not fear to find them the resting-places of the bloated reptile to which their name refers. Dr. Badham, however, mentions that an anonymous Italian author, asserts that in Germany toads have been actually seen sitting on their stools; but, as the Doctor humorously remarks, even in Germany it must be admitted that they do not use them as frequently as we might expect, had they been created for this end. Spenser, in his Faëry Queen, takes the name as significant—

"The grisly todestool grown there might you see,
And loathed paddocks lording o'er the same."

The name of paddock* for toads is still in common use in the North of England and in Scotland.

"In that most grisly and ghastly wax-work exhibition at Florence," says the Doctor, "representing a charnel-house filled with the recent victims

* "Paddock calls—Anon: Anon:"—SHAKSPEARE.

to a raging plague in every stage of decomposition, the toad and his stool are not forgotten; but the artist who had here to deal with matter, and to consult what it would bear, has not put his toads upon brittle stools, lest giving way, both should come to the ground; he has been content to convert them into toad-umbrellas, and to spread them as a covering over their heads."

CANTHARELLUS CIBARIUS.

But the Fungus or Mushroom tribe comprehends a large number of plants besides mushrooms and toad-stools. Myriads of microscopic funguses crowd every decaying object, while on the one hand we find the fungus so large as that the arms of a tall man could scarcely enclose it; on the other, the grain of sand would far exceed it in size. These plants grow with a degree of rapidity quite unknown in any others, acquiring the size of many inches in the course of a night, especially in the state of atmosphere which succeeds a storm. Fries, who is a high authority on the subject, says, "Their sporules (seeds) are so infinite that in a single individual of Reticularia maxima, I have counted above 10,000,000; so subtile that they are scarcely visible to the naked eye, and often resemble thin smoke; so light (raised, perhaps, by evaporation into the atmosphere), and are dispersed in so many ways, by the attraction of the sun, by insects, wind, elasticity, adhesion, &c., that it is difficult to conceive a place from which they can be excluded."

It is not alone on the decaying tree that the fungus springs up. Sometimes it even arises on the larger mushroom, or clusters in numbers on oranges, or plums, making on these and other fruits and substances, what we term mildew. The mouldiness of bread or cheese, or of the preserved fruits which have been kept too long; the blight and rust on corn; the ravages of "dry rot," which are so destructive to wooden buildings, are all caused by the growth of minute funguses. There are dark ink-like spots on the leaf of the maple produced by these plants; and orange, or yellow, or velvety patches, arise on the rose-leaf, or on the foliage of the poplar or willow tree, or might seem, from their redness, to be little beads of coral, on the leaves of other plants. Some funguses crowd beneath the bark of plants, others between the opposite surfaces of leaves. There are shaggy coats hanging about the wine or beer cask, and these are of this tribe; and one which has lately been renowned as the Vinegar Plant (*Penicillum glaucum*) may be produced at will, by placing an admixture of treacle, sugar, and water in a warm place. The housewife complains that her beer and vinegar are mouldy, and lo, a fungus has produced this effect. The farmer loses his expected crop, for a fungus has spread over the roots of the plants, and as in the case of the species, called in France, "La mort du safran," has destroyed the whole worth of the produce. This fungus, which attacks the bulbs of the cultivated saffron and crocus, spreads with the greatest quickness over the field, and is so destructive that the smallest quantity of earth from the infected soil is said to be capable of communicating this plague, even if the ground were not planted with saffron for twenty years after. Another fungus, called the Willow Cryptomyces, is equally pernicious to the Willow tree. Speaking of this species, Dr. Greville says, "A cluster of willows which was attacked in the beginning of the season by this plant has been nearly destroyed by it; and from the rapidity of its progress, I have no doubt that a whole plantation might in the course of a couple of seasons be rendered

good for nothing. At a little distance, the affected branches look as if they were dry, scorched, and rotten."

Funguses attack books, the object-glasses of telescopes, and neglected window-panes, growing in the latter cases on the particles of dust which insinuate themselves into the glass. The wardrobe, the contents of the dairy, the leather of shoes and portfolios, have each their fungus growth; though it is remarkable that mouldiness may be averted by any strong perfume.

Our very teeth are beset with these plants, and a writer in Silliman's Journal, states, that he rarely finds a person whose teeth are quite free from these microscopic objects, which he says are not to be removed by any species of dentifrice in common use, nor even by frequent brushings, but which yield only to the application of soap.

Funguses are most frequently found on decayed animal or vegetable matter, but there are some which will grow on a living animal, and gradually destroy it. One kind is described as "having a particular fancy for the hoofs of horses, and for the horns of cattle, growing on these only." The disease termed muscadine, which is fatal to so many silkworms, is the result of the growth of a fungus on their bodies; while healthy caterpillars, if brought within reach of a silkworm, which has been killed by this disease, soon takes the infection, and dies. The well-known vegetating wasp, a species of Polystrix, becomes a prey to a fungus which rises out of its living structure, and soon numbers it with the dead; while some of the tribe visit "the very wards of our hospitals, and grow out of the products of surgical disease."

Some of these very minute fungus plants exhibit great beauty when seen under a microscope. Dr. Badham has described one which is common on a species of mushroom, "spreading over some of the Russulæ in decay, especially if the weather be moist, like thin flocks of light wool, presenting on the second day a bluish tint on the surface." Under a microscope this was seen to consist of myriads of little glass-like stalks, forked into numerous clear twigs, each ending in a little clear knob, which, when it bursts, scatters the seeds. These adhere to the sides of the stalks like so many tiny limpets.

Another very beautiful little fungus, which was gathered by Dr. Mantell on Clapham Common, and has since been found elsewhere, grows on flints, and is, to the naked eye, a small snow-white speck, not more than one-fourth of the size of a pin's head. When magnified it appears like a little cup with a cover, beautifully marked with radiating lines. On being punctured it emits a blood-red liquid, filled with sporules. This plant, the Craterium pyriforme, was sent by Dr. Mantell across the Atlantic, and was still living when it reached his friend in America, and this writer remarks that he has had pebbles on his mantelpiece for months, and that the vegetable upon them was yet alive, and bled as usual upon puncturing.

Another very singular circumstance connected with some of the fungus tribe is that of their emitting light. The pale-green light of the mines of Dresden, almost dazzling the eye and adding a strange enchantment to these beautiful places, is often described by travellers, and is produced by the growth of a minute fungus. Backhouse, when at Norfolk Island, saw great numbers of a small fungus growing from decayed wood or straw, and very abundant among the sugar-canes. The brilliance proceeded mostly from the under part of the cup, and its bluish-green colour procured for it the name among the colonists of Blue Light. The Agaricus

of the olive is not uncommon in Italy, and shines like the fire-fly amid the darkness of the grove. Gardner, in his 'Travels in the Interior of Brazil,' describes his discovery of one of these singular mushrooms in these regions. "One dark night," says this writer, "about the beginning of December, while passing along the streets of the Villa de Nativade, I observed some boys amusing themselves with some luminous object, which I at first supposed to be a kind of large fire-fly; but on making inquiry I found it to be a beautiful kind of phosphorescent fungus belonging to the genus Agaricus, and was told that it grew abundantly in the neighbourhood, on the decaying leaves of a dwarf palm. Next day I observed a great many specimens, and found them to vary from one to two and a half inches across. The whole plant gives out at night a bright phosphorescent light of a pale-greenish hue, similar to that emitted by the larger fire-flies, or by those curious soft-bodied animals the Pyrosomæ; from this circumstance and from growing on a palm, it is called by the inhabitants Flor do coco: the light given out by a few of these fungi in a dark room was sufficient to read by." Mr. Gardner brought home dried specimens of this plant, which has since been described by the Rev. M. J. Berkeley, as the Agaricus Gardneri.

The limits of this paper will only allow of a slight glance of the uses to which various species of fungus may be applied. Some yield a good colour for the dyer, and from one species ink is made. Some are used in stanching blood, others for stupifying bees, and making tinder. The well-known substance called Amadou, so extensively used in Italy, is made of a fungus beaten to pieces in a mortar, then hammered out, and having been dipped in a solution of nitre, finally dried in the sun. In our own country this Amadou is employed for many household purposes, and in Franconia pieces of this substance are stitched together for clothing. The Laplanders burn it in order to render their houses and rein-deer secure from the incursions of the gad-flies, which greatly distress the animals. Several medical practitioners in London have used large sheets of Amadou on the couches of bed-ridden invalids, finding it more elastic than the sheet of chamois leather, and less liable, by crumpling, to irritate the skin.

A species called the Scaly Polyporus, is described by Dr. Badham as making a razor strop "very superior to any of those at present patented, and sold with high-sounding epithets far beyond their deserts. To prepare the Polyporus for this purpose, it must be cut from the ash-tree in autumn, when its juices have been dried and its substance has become consolidated; it is then to be flattened out for twenty-four hours in a press, after which it should be carefully rubbed with pumice, sliced longitudinally, and every slip that is free from the erosions of insects, be then glued upon a wooden stretcher. Cæsalpinus knew all this, and the barbers in his time knew it too; and it is not a little remarkable that so useful an invention should in an age of puffing advertisement and improvement like our own, have been entirely lost sight of." It has also been highly recommended as a cleansing preparation for the hair.

Enough will have been said to convince the readers that the Fungus tribe abounds with objects of interest and beauty. A few of them have also sweet odours, but on the other hand there are many whose scent is so disgusting as to become unbearable within doors. There are mushroom plants which have the perfume of cinnamon, of apricots, of fresh meal, of tarragon, red mullet, tallow or hawthorn blossom. They are in flavour sweet or sour, or pungent, rank, acrid, bitter or flavoured like the nut. So numerous is the tribe that not less than five thousand species are known,

and each year is adding some new plant to the list. Of British species only, the number is so great, that when merely catalogued and described, they are sufficient to fill an octavo volume of nearly four hundred closely printed pages.

NINEVEH.—THE COURT.

A King Worshipping.

The government of the Assyrian empire, like that which has prevailed in all ages in heathen Oriental countries, was an absolute despotism. The monarch, in the East, exercises the most uncontrolled authority over the property, the rank, and the life of every individual in his dominions, from the highest to the lowest. His will is absolute law. The despotic decrees of Nebuchadnezzar, of Darius, and of Ahasuerus, show how entirely the lives of their subjects were in the hands of these autocrats; "whom they would they slew, and whom they would they kept alive; whom they would they set up, and whom they would they put down."* (Dan. v. 19.) And we cannot doubt that the sway of the Assyrian monarchs was as irresponsible as that of their Babylonian and Persian successors. For though but little information concerning them has come down to us from extraneous sources, that little exhibits the Assyrian kings as haughty despots, consulting their own pleasure, and acknowledging no superior among men. The insulting message of Sennacherib to Hezekiah and his people, when he threatened Jerusalem, is an example of their unparalleled arrogance.

According to the testimony of a Jewish writer (Tobit i. 18), this monarch exercised his authority in a tyrannical manner, "slaying many in his wrath," when he returned baffled to Nineveh.

The inscriptions read by Col. Rawlinson, commemorating the acts of the Assyrian kings, display, though in a less offensive style, the same egotism as the vaunts of Sennacherib; the aggrandisement of self pervades them all, everything is made subject to the will of the monarch, and all contributes to his glory; just as in the self-complacent boast of Nebuchadnezzar, no place could be found for any one but himself.

* This perfect absolutism was not inconsistent with the existence of a council of "wise men, who knew law and judgment" (Esth. i. 13—22), whose advice the monarch was accustomed to seek, and often to follow. It would even seem that, on some occasions, such a council drew up statutes (Dan. vi. 7—9), to which they asked and obtained the king's sanction and signature. It is observable that the proclamation of a public fast in Nineveh, on the preaching of Jonah, was "by the decree of the king and his nobles." (Jon. iii. 7.)

"The king spake, and said, Is not this great Babylon, that I have built for the house of the kingdom by the might of my power, and for the honour of my majesty?" (Dan. iv. 30.)

In the sculptured monuments everything is in accordance with this idea. The royal person, his pomp and magnificence, his religious ceremonies, his state levees, his wars, sieges, and triumphal returns, his prowess and success in hunting the savage beasts of the forest, the tribute poured at his feet by distant nations,—form the continual subjects of pictorial representation; and amidst all, he is the sun around which everything revolves, the divinity for whose pleasure everything is accomplished.

This arrogation of supreme power did not preclude the recognition of the gods, nor humble homage to them. For though he claimed to be himself, as it were, a divinity, it was only in this lower world; the whole of which, including himself, was subordinate to the supposed divinities that governed the celestial domain. He claimed to represent, or reflect, the great heavenly deity; but the implicit homage and obedience which he exacted on earth, he professed to pay to his liege lord above. Hence, in the historical inscriptions, we find combined in the same person the characters of "powerful and supreme ruler," and "humble worshipper of Assarac and Beltis;" and he who receives homage from the nations around, and bestows all the earth upon the people of his own kingdom, invokes the protection of the gods upon the empire of Assyria. And that mighty conqueror, Sennacherib, who in his arrogance claims superiority not only over the nations, but over the gods whom *they* worshipped, is presently seen in the attitude of an humble worshipper "in the house of Nisroch [or Assarac?] his god."

Thus, too, as we have already intimated we see in the sculptures the same monarch at one time mowing down his enemies, or receiving the deferent homage of his courtiers; at another kneeling beside the sacred tree, and with uplifted hand offering up his petitions to the idolatrous symbol above, that represented in his judgment the God of heaven.

It does not appear that the Assyrian king exercised proper priestly functions. Priests attended him when worshipping, and ministered with the sacred symbols, the basket, the pine-cone, or the branch of fruit or flowers; or bore in their arms the animals devoted to the idol; but these implements and accessories of priestly service are never seen in the royal hands, nor is he ever depicted as adorned with what we suppose to be the insignia of the sacerdotal office, the eagle-wings, the horned-cap, or the vulture's head.

Yet the priests were evidently subordinate to the monarch; even in the act of worship they stood behind him, and presented their symbols towards the idol over his head or over his shoulder. And when he sat enthroned in royal state, priests formed part of the courtly throng that stood around, bearing indeed still the insignia of their office, and holding aloft their symbols with an air of authority that contrasted with the folded hands and humble attitude of the eunuchs and other officers of the household, yet mingling with them, alike ministering to the pomp of their royal master.

So, in the historical inscriptions, the monarch speaks of the public worship as entirely under his own direction, and of the priests to whom it was committed as being appointed by himself. "My servants erected altars [or tablets] in that land to my gods;" "I raised altars to the great gods;" "I erected altars and founded temples to the great gods" "I dedicated a temple to the god Rimmon;" "I perform the rites which belong to the

worship of Assarac, the supreme god;" "I established the national worship throughout the land, making a great sacrifice in the capital city, in the temple, which had been there raised to the gods;" "I *appointed priests* to reside in that land to pay adoration to Assarac, the great and powerful god, and to preside over the national worship;" "I set up altars to the supreme gods, and *left priests* in the land to superintend the worship;"*—all these phrases prove how entirely the monarch was the head of the Assyrian worship, while yet his office did not interfere with that of the proper priesthood.

In the court of Persia, which probably had at first very much in common with those of Babylonia and Assyria, the person of the sovereign is and always has been held in almost religious veneration. Real or affected awe sits on the countenances, and is apparent in the motionless attitudes of those who surround him; and even his command to approach his person is obeyed with manifest dread and reluctance. "I entreat your majesty not to order me to advance nearer the presence; I am overpowered" (literally, I burn, *mi-souzum*), was the reply of a very young courtier, in fact a boy, when first introduced to the present monarch of Persia, and desired to advance towards him. His majesty was delighted.†

We know, both from sacred and profane history, that the most solemn precautions were adopted, to maintain in the popular mind a due sense of "that divinity that doth hedge a king;" his presence being of rare and difficult access, not only to guard against treacherous assaults and assassination, but in order that the people, accustomed to see their sovereign only on rare occasions, and never except invested with state and splendour, —might be led to regard him as a being of a superior order, not subject to the common wants and infirmities of humanity, and might therefore be more willing to submit to the exercise of despotic authority. The ancient Persian monarchs made it a capital crime for any one to enter into their presence unbidden, and Herodotus has recorded the fate of Istaphernes, a prince of the court of Darius, who, disregarding the prohibition, was put to death.‡ So stringent was this regulation, that not even the members of the royal family, not even the favourite wife, were excepted. Queen Esther well knew that "she put her life in her hand," when, on behalf of her people, she ventured to appear uncalled before King Ahasuerus.

Some of the Bahdinan princes (the noblest and most sacred of the Koord families) are in the habit of covering their heads with a veil whenever they ride out, that no profane eye may look upon their countenance.§ This was the practice also, according to Benjamin of Tudela, with the caliphs of Bagdad.

It is probable that etiquette among the Assyrians did not quite proceed to such lengths as this. For Herodotus attributes the severity of these regulations to Deioces the Median, who successfully revolted from the Assyrian dominion about a century before the overthrow of the empire. "He, for the first time, established the following rules: that no man should be admitted to the king's presence, but every one should consult him by means of messengers, and that none should be permitted to see him; and moreover that it should be accounted indecency for any to laugh or spit before him." ‖

But that some reserve of this kind was practised by the kings of Assyria at a much earlier period, a curious evidence has been brought to light. Since the publication of Mr. Layard's first works, he has made fresh and

* Rawlinson's Commentary, *passim*. † Fraser's Persia, p. 395.
‡ Herod. iii. 118. § Rich's Koordistan, i. 155. ‖ Herod. i. 99.

extensive excavations in parts of the mounds not before explored; and one result is said to have been the finding of the throne on which the monarch sat in his splendid palace. It is composed of metal and of ivory,—the metal being richly wrought and the ivory beautifully carved. The throne seems to have been *separated from the state apartments* by means of *a large curtain*,—the rings by which it was drawn and undrawn having been preserved. No human remains have come to light, and everything indicates the destruction of the palace by fire. It is said that the throne has been partially fused by the heat.

The awe in which the person of the sovereign is and always has been held in Oriental courts is, doubtless, by a natural course of action and reaction, partly the cause and partly the result of the extraordinary majesty of countenance, which commonly marks an eastern monarch. The consciousness of real uncontrolled power must tend to produce a calm self-relying dignity, and this cannot fail to produce its effect on the beholders. It is not mere beauty of feature or grandeur of form, though these are elements in the result; and the aristocracy of the East display the very noblest examples of the human animal. The description which Sir Robert Ker Porter gives of the Persian king at the festival of Nurooz will exemplify our meaning:—

"He entered the saloon from the left, and advanced to the front of it, with an air and step which belonged entirely to a sovereign. I never before had beheld anything like such perfect majesty; and he seated himself on his throne with the same indescribable, unaffected dignity. Had there been any assumption in his manner I could not have been so impressed. I should then have seen a man, though a king, theatrically acting his state: here I beheld a great sovereign, feeling himself as such, and *he looked the majesty he felt*."

Every one who has looked at the sculptures which represent the Assyrian monarch sitting in royal state, or standing in the midst of his courtiers, themselves "altogether kings," "all of them princes to look to," must have been struck with the majesty of his countenance, and the unostentatious dignity of his action. This is most conspicuous in the kings of the earlier period, for in some of the portraits of Shalmaneser, while there is still the same grace and dignity, the countenance is less majestic.

We may trace the same facts in some of the allusions of Scripture:—

"Then said he unto Zebah and Zalmunna, what manner of men were they whom ye slew at Tabor? And they answered, as thou art, so were they; each one *resembled the children of a king*." (Judg. viii. 18.)

The "golden sceptre" mentioned in the Book of Esther, receives an interesting illustration from the sculptured monuments, both of Persia and Assyria. In the bas-reliefs of Persepolis, copied by Sir Robert Ker Porter, we see King Darius enthroned in the midst of his court, and walking abroad in equal state; in either case he carries in his right hand a slender rod or wand, about equal in length to his own height, ornamented with a small knob at the summit. In the Assyrian alabasters, as well those found at Nimroud as those from Khorsabad, the "great king" is furnished with the same appendage of royalty, a slender rod, but destitute of any knob or ornament. On the Khorsabad reliefs the rod is painted red, *doubtless to represent gold*; proving that the "golden sceptre" was a simple wand of that precious metal, commonly held in the right hand, with one end resting on the ground, and that whether the king was sitting or walking; for in the Assyrian sculptures we see it in the hand of the king when sitting

on his throne, and when conversing familiarly face to face with his chief minister.

The golden sceptre has received little alteration or modification, since that which it underwent in the added ornament at the summit, on its transmission from the Assyrian to the Persian court. Sir William Ousely found it nearly the same as of old, not however carried by the monarch himself, but borne by special officers. "Some men," he observes, "whose office I neglected to inquire, held each in his hand a sceptre, or slender wand, nearly four feet long, and apparently of gold enamelled green, with a figure of a bird at top, as large as a real sparrow, and made of emeralds, rubies, and other jewels."

WILD FLOWERS.

FORGET-ME-NOT. (*Myosotis palustris.*)

THE various traditions which gave rise to the popular name of this bright flower throughout Europe, are told by poets and historians. Agnes Strickland says that Henry of Lancaster, when in exile, gave it to the Duchess of Bretagne, and by placing it on his collar of S. S. with the initial letter of his *mot* or watchword, "Souveigne vous de moy," rendered it the symbol of remembrance. Bishop Mant gives us the traditionary creed more generally received, though certainly less entitled to belief. A lady and a knight were sitting by the river side, when the former wished for the bright blue blossoms to braid among her hair. The knight dashed into the water to gratify her wishes, and gathered the flowers, but was overborne by the strength of the current.

"Then the blossoms blue to the bank he threw,
Ere he sank in the eddying tide;
And 'Lady, I'm gone, thine own knight true,
Forget me not,' he cried.

"The farewell pledge the lady caught,
And hence, as legends say,
The flower is a sign to awaken thought
Of friends who are far away."

Thus say the poets, but the philosophers believe them not; and so one of our great botanists suggests that after all the flower owes its name to its beautiful blue petals and yellow eye, which once looked upon are not likely to be forgotten.

This plant is called also Great Scorpion grass, and Mouse ear, and is, during the summer months, very common in our humid meadows, bogs, banks of rivers, rivulets, and ditches. It grows in similar places throughout Europe, and also in many parts of Asia and North America. A variety has been found with white flowers.

There are eight native species of the genus, and all have blue blossoms. The little brilliant blue flower found in fields from June to August, and often called Forget-me-not, is the Field Scorpion grass (*Myosotis arvensis*). It is very abundant on cultivated lands, on hedge banks, and in groves, &c. The name of the genus is derived from two Greek words, signifying mouse and ear, from the shape of the leaves.

AVALANCHES.

In all countries where the mountains rise to a great height, and are covered with snow, the fall of Avalanches occurs more or less frequently. These terrible and destructive phenomena consist of immense masses of ice or snow, which accumulate on the upper parts of mountains to such an

extent, that the slopes on which they rest can no longer support them; they then slide off by their own weight into the valleys beneath with amazing velocity, and with such resistless force, that everything is swept away before them; even whole forests and villages when such occur in their course.

There are several kinds of Avalanches to which distinct names are given by the inhabitants of the Alps. Those most commonly seen by tourists are *Ice Avalanches*, or portions of glaciers giving way under the influence of the summer's sun. When seen from a distance, these masses of ice, breaking into smaller fragments against the rocks as they fall, resemble rushing cataracts, and are accompanied by a similar thundering noise. Such Avalanches mostly fall in uninhabited districts, and are seldom fatal in their effects; they occur only during summer, but are very frequent at that season. They are most numerous a little after noon, when the sun exercises the greatest influence in loosening the masses and causing them to break off.

The appearance of the Avalanches descending the sides of the Jungfrau, one of the Bernese Alps, is well described in the following extract from Murray's "Handbook for Travellers in Switzerland:"—

"The attention is first arrested by a distant roar, not unlike thunder, and in half a minute a gush of white powder, resembling a small cataract, is perceived issuing out of one of the upper grooves or gullies; it then sinks into a lower fissure and is lost only to reappear at a lower stage, some hundred feet below; soon after another roar, and a fresh gust from a lower gully, till the mass of ice, reaching the lowest step, is precipitated into the gulf below. By watching attentively the sloping white side of the Jungfrau, the separation of the fragments of ice from the mass of the glacier which produces this thunder, may be seen at the moment when disengaged, and before the sound reaches the ear. Sometimes it merely slides down over the surface, at others it turns over in a cake; but in an instant after it disappears it is shattered to atoms, and in passing through the different gullies is ground to powder so fine, that as it issues from the lowest, it looks like a handful of meal; and particles, reduced by friction to the consistence of dust, rise in a cloud of vapour. Independent of the sound, which is an awful interruption of the silence usually prevailing on the high Alps, there is nothing grand or striking in these falling masses; and indeed it is difficult, at first, to believe that these echoing thunders rise from so slight a cause in appearance. The spectator must bear in mind that at each discharge whole tons of ice are hurled down the mountain, and that the apparently insignificant white dust is made up of blocks capable of sweeping away whole forests, did any occur in its course, and of overwhelming houses and villages. During the early part of summer three or four such discharges may be seen in an hour; in cold weather they are less numerous; in the autumn scarcely any occur."

Earlier in the year, Avalanches of a more dangerous character fall with considerable regularity, sliding down habitual channels which become perfectly smooth from the friction which they thus undergo from time to time. These regular Avalanches are eagerly expected by the peasants as the sure tokens of the commencement of spring. But circumstances, which cannot be foreseen, will sometimes divert these Avalanches from their usual course, or cause them to fall unexpectedly. They consist of masses of compact snow and ice, which are yet clammy and adhesive, by which the traveller may be crushed or suffocated in a moment. The masses are

sometimes of enormous extent, covering meadows and forests with a thick layer of snow, which the heat of two or three summers is scarcely sufficient to melt. The instantaneous fall of these *Snowy Avalanches* may overwhelm a village in the night, without the inhabitants being aware of the calamity which has befallen them. Such was the case in 1749, when the village of Bueras, in the Canton of the Grisons, was buried, and at the same time removed from its site. The inhabitants, on awaking in the morning, could not imagine why daylight did not appear. One hundred of these unfortunate villagers were dug out of the snow, sixty of whom were still alive, the hollows in the snow having contained air enough to support life in the more robust among them.

"To guard as much as possible against such accidents, very large and massive dykes of masonry, like the projecting bastions of a fortification, are in some situations built against the hill side, behind churches, houses, and other buildings, with an angle pointing upwards, in order to break and turn aside the snow. In some valleys great care is bestowed on the preservation of the forests clothing their sides, as the best protection of the district below them from such calamities. These may truly be regarded as sacred groves; and no one is allowed to cut down timber within them, under pain of a legal penalty. Yet they not unfrequently show the inefficiency even of such protection against so fearful an engine of destruction. Whole forests are at times cut down and laid prostrate by the Avalanche. The tallest stems, fit to make masts for a first-rate man-of-war, are snapped asunder like a bit of wax, and the barkless and branchless stumps and relics of the forest remain for years like a stubble-field to tell of what has happened."

Some years ago, the Austrian Government, desirous of connecting the province of Sondrio with the Tyrol by a mountain-road, which was not to pass over any portion of Switzerland, but to lie entirely within their own dominions, caused a road to be made over Monte Stelvio, through a region frequently exposed to Snowy Avalanches. This road is a very interesting one, not only from its being the highest carriage road in the world, but on account of the skill with which it is constructed, and the sublime scenery through which it passes. It is described as a singular and astonishing example of human labour. For a considerable distance half its width is covered in by strong wooden galleries, with roofs and supports sufficiently massive to resist the pressure of the descending Avalanches. At one part of the road the magnificent Ortler Spitz—the third of the European mountains in height, being fourteen thousand four hundred feet above the sea-level,—opens suddenly to the view of the traveller "with a vast and appalling effect, as it is seen from its extreme summit to its base, robed in everlasting snows, which descend on its sides in enormous glaciers, and stream into the valley below the road. Immense masses of rocks, in themselves mountains, throw out their black and scathed forms in striking contrast with the brightness of the glaciers which they separate." The Tyrolese side of the pass is much steeper than the Italian, and the road is formed into a series of zig-zags in order to preserve a gradual descent. By this means the fall never exceeds ten inches in a hundred. A post-house, built among these turnings, was destroyed in 1826 by an avalanche. It was built with the utmost solidity, in order to resist the weight of the falling snow; but the event proved how feeble is the arm of man to contend with "the avalanche,—the thunderbolt of snow,"—for the house was smashed to atoms, and the postmaster found dead with a rock upon

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his breast, which ten men could not move. The two ostlers, who were in the stable at the time, were saved. It is supposed that if the building had been constructed with a sloping roof, so as to assist the descent of the avalanche, instead of opposing its progress, it might have escaped. On the summit of the pass, at a height of nine thousand two hundred and seventy-two feet above the level of the sea, and seven hundred and eighty above the line of perpetual snow, stands a solitary house of refuge, one story high, inhabited by an inspector of the road. It is the highest permanent habitation in Europe. Other houses are established in convenient situations along the road, at some of which the travellers may find rest and refreshment; at others only shelter.

Another kind of avalanche, and the most destructive of all, remains to be noticed. This is the *Drift Avalanche*, which takes place in winter after a very heavy fall of snow. Violent gusts of wind detach large masses of snow from the heights where they have accumulated: these, falling on the lower declivities, force off other masses, so that a volume of loose snow of immense extent is accumulated and cast with astonishing rapidity and force into the valleys beneath, sometimes traversing a distance of at least ten miles. These avalanches are greatly dreaded, not more for their own violence, than for that of a rush of air which accompanies them, and is occasioned by them, and which, "like what is called the wind of a cannon-ball, extends its destructive influence to a considerable distance on each side of the actual line taken by the falling mass. It has all the effect of a blast of gunpowder: sometimes forest-trees, growing near the sides of the channel down which the snow passes, are uprooted and laid prostrate without having been touched by it." This effect may also accompany the other descriptions of avalanche, as in the terrible catastrophe which occurred in the year 1819, in the valley of Visp in Valais, where the village of Randa was destroyed by an ice avalanche. This village was situated near the base of a mountain mass, which rises nearly perpendicularly to a height of more than nine thousand feet, and forms part of the snowy mountain called the *Weisshorn*, or the "White Horn." This is surrounded on all sides by huge glaciers, one of which, before the accident referred to, had advanced to the very edge of the precipice and was overhanging it, when an enormous piece of ice suddenly fell with a terrible crash into the valley below, where it covered with ice, rubbish, and fragments of rock, a space of two thousand four hundred feet in length, and a thousand feet in width, to a depth of more than a hundred and fifty feet. This space was uninhabited, but not far from it was the village which was destroyed by the compression of the air produced by the fall. The force of the gust caused by this compression was so powerful that it raised millstones from the ground, and conveyed them to a spot several yards higher than that from which they had been removed. The houses were scattered like chaff; several ponderous beams were removed into a forest nearly a mile off, and the steeple of the church, which was a massive building of stone, was broken down.

Such is the fearful power of the Avalanche, and such are some of the grand yet terrific spectacles which impress with awe and reverence the mind of the mountain traveller.

THE SPERM WHALE.

It is not to any extraordinary development of the brain of this animal, nor even of the skull, that the immense bulk of the head is owing; the jaws indeed are greatly lengthened, but the brain is very small, and seated at the back of the head, the whole anterior part forming a huge cavity, known to whalers as the "case," which is not enclosed by bone, but by a thick, tendinous, elastic skin, and lined with a beautiful, glistening membrane. This cavity is filled with a clear oil, sometimes to the amount of ten barrels, which after death cools into the granulated substance, well known, when purified, as *spermaceti*.

The coat of blubber, contained in the texture of the skin of the body, produces an oil, which is much valued, for its clearness and other qualities, and is known as sperm-oil. These two products form the principal object of the Sperm-whale fishery; a pursuit which, from the remote distance at which it is prosecuted, the protraction of exile which each voyage involves, the romantic character of its incidents, and its hazardous nature, is perhaps unrivalled among pacific occupations.

Mr. Beale, in his very interesting volume on the Sperm-whale, describes a male of the largest size as about eighty-four feet in length, and twelve or fourteen in diameter, at its thickest part. The fins are small, being no more than six feet long by three broad. They appear to be used rather in balancing the body and supporting the young, than in giving progress in motion, which is the proper office of the tail. The skin is smooth, of a very dark grey hue, nearly black on the upper parts, but silvery beneath. Some, however, are pied. Old males usually have a large spot of pale grey on the front of the head, when they are said to be "grey-headed." The eye is situated just above the angle of the mouth; and over this at the junction of the head with the body, there is an elevation called the "bunch of the neck;" from hence the outline of the back is nearly straight, to within one-third of its length from the tail, where there is a larger prominence, called the "hump;" it now rapidly tapers away to the tail, and this slender part is technically distinguished as the "small,"

while the huge tail spreading widely on each side bears the name of "flukes."

The motions of this enormous animal are exceedingly curious: when moving perfectly at leisure, he swims slowly along, just beneath the surface, effecting his progress by gently striking the fluid with his tail from side to side obliquely. The *bunch* and *hump* may be seen above the water; and by the disturbance which they cause in cutting the surface, some foam is produced, by which an experienced whaler can judge, even at some miles' distance, how fast the animal is going. When alarmed, however, or from any cause inclined to increase his velocity, he uses a very different mode of progression. The broad tail now strikes the water upward and downward alternately with great force; at every blow downward the forepart sinks several yards into the water, while by the force of the upward blow, the head is thrust entirely out of the water. A whale can swim in this way, the head alternately appearing and disappearing, which the seamen call "going head out," at the rate of twelve miles an hour. In the facility with which the enormous head is projected, we see the wisdom of its immense size; bulky as it is, the fluid oil with which it is filled, rarefied by vital heat, renders it the most buoyant part by far of the animal, being of itself considerably lighter than the surrounding medium: hence, little effort is required to project the breathing orifice, on the summit of the muzzle, into the air; while, again, the swiftness of the animal is greatly increased by the removal of so broad and bulky an extremity from the dense fluid through which it is swimming. "O Lord! how manifold are thy works! *in wisdom* hast thou made them all."*

The Sperm-whale is found in all seas, but is most abundant in the Pacific, at some particular points of which herds are said to congregate periodically. The pursuit of this enormous animal forms an important branch of commercial enterprise, in which the bold seamen of the United States have the greatest share. The voyage commonly occupies three or four years, and is one of unexampled hazard and privation. Ships of three or four hundred tons are selected for this pursuit, strongly built, and manned with a crew of about thirty hands. A watch is stationed aloft immediately on leaving the port, although the prey is rarely met with in the North Atlantic. This watch is never intermitted during the whole voyage, or at least until a full cargo is obtained. The watch, on the sight of a Sperm-whale, immediately communicates the welcome information by calling aloud in a peculiar tone, "There she spouts!" a cry which never fails to produce a general rush on deck of all hands. "Whereaway?" eagerly demands the master; the position of the distant object is pointed out, and at each fresh "spouting," the watch, accompanied by every individual on board who has caught sight of the Whale, vociferates, "There again!" The spoutings being all performed, the elevation of the broad tail into the air, preparatory to descent, is announced in the same manner by "There goes flukes!"

The object of these announcements is explained by the remarkable regularity with which every motion connected with the respiration of this animal is performed. The length of time it remains at the surface, the number of expirations, or *spoutings*, performed on each occasion, the length of the interval between the spouts, the time it remains submerged before again rising to breathe, are all, when the animal is undisturbed, as regular in succession and duration, as can be imagined. This circumstance is of

* Psalm civ. 24.

the greatest value to the whaler; for when the periods of any particular Whale have been observed, it may be calculated even to a minute when it will reappear, and how long it will continue at the surface.

At the first announcement, the boats, which are constantly kept in readiness, are lowered, and manned with joyful alacrity. Every nerve is strained to reach the animal before his spoutings are out, which, in a large bull-whale, may be about ten minutes. If he is too far off, however, they strive to note the direction in which he dives, stationing themselves near the spot where they expect he will emerge. On his reappearance, the boats are rowed up as silently as possible, and the harpooner of the foremost darts his weapon with all his strength. At the same moment, he cries "Stern all!" and the oarsmen give the boat stern-way with precipitation. The Whale in his agony dives perpendicularly, drawing the line of the harpoon swiftly through its grove; the other boats are ready to bend on their lines, each of which is two hundred fathoms long; for a Whale will sometimes carry down four lines, descending to the depth of nearly a mile. But again he approaches the surface; "the gurgling and bubbling water, which rises before, proclaims that he is near; his nose starts from the sea; the rushing spout is projected high and suddenly from his agitation." The other boats now infix their harpoons, and sharp steel lances are thrust deeply into the body.

The most dangerous part of the enterprise now ensues; the Whale is in his last agony: he dashes hither and thither, snaps convulsively with his long lower jaw, rolls over and over, coiling the line round his body, or leaps completely out of the water. The boats are often upset, sometimes broken into fragments, and the men wounded or drowned. The crimson blood, spouted from the blow-hole, falls in showers around; the poor animal whirls rapidly round in unconsciousness, in a portion of a circle, rolls over on its side, and is still in death.

The body is then towed to the ship; the head is cut off and secured at the stern; a hole is cut into the skin of the fore part of the body, into which a large hook is inserted. A strong pulley being attached to this hook, the blubber is thereby hoisted up, as it is gradually cut by sharp spades in a spiral strip, going round and round the body. As this band is pulled off, the body revolves, until the stripping reaches the *small*, when it will turn no more. In the meantime, the head having been placed in an upright position, an opening is made in the front of the *case*, and the spermaceti dipped out with a bucket at the end of a pole. The *junk*, a thick mass of tough, tendinous substance, situated beneath the *case*, is then extracted and cut into pieces, as well as the blubber; both of these substances being rendered into oil by means of heat. The products are then stowed away in barrels in the hold.

The preparation of the crude spermaceti, when brought home, is thus performed:—"The mass is put into hair or woollen bags, and pressed between plates of iron in a screw-press, until it becomes hard and brittle; it is then broken into small pieces, and thrown into boiling water, where it melts, and the impurities are separated from it. After being cooled, and taken from the first water, it is put into a boiler of clean water, and a weak solution of potash is gradually added. This is thrice repeated, after which the whole is poured into coolers when the spermaceti concretes into a white semi-crystallized mass, and on being cut into small pieces exhibits a beautiful flaky appearance, so well known as belonging to the spermaceti of commerce."

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INSTINCT.

The tail, or hinder part of the hermit-crab, has no crust or shell upon it, as the body and the claws have; and therefore this animal has to seek a suitable dwelling place, some empty univalve shell, into which it insinuates its tail, and from which its head and arms project. With this power of selecting a house, it removes when it has outgrown the shell in which it has dwelt, and is seen trying the empty shells upon the shore, and contending with others of its own species.

Surveying such instances, we cannot resist the conviction of the fine adaptation of the sensibilities and instincts of animals to their forms and substances.

ANIMAL ADAPTATION.

The larvæ of insects have no exterior members for walking or flying; but to enable them to creep, they must have points of resistance, or their muscles would be useless. Their skins suffice, and they are hardened by a deposit within them, for this purpose. But if this skin were not further provided, it would be rigid and unyielding, and be no substitute for bone. These hardened integuments are, therefore, divided into rings; to these the muscles are attached; and as the cellular membrane between the rings is pliant, the animals can creep and turn in every direction.

As goodly a volume has been written on the muscles of a caterpillar, as has ever been dedicated to those of the human frame. A very minute anatomical description has been made of the caterpillar which feeds upon the willow; and we here see that the annular construction of the hard integument determines the plan of the whole anatomy, the arrangement of the muscles, and the distribution of the nerves. Each ring has its three sets of muscles; direct and oblique, traversing and interweaving, but yet distinct and symmetrical; and all as capable of being minutely described as those of the human body. Lyonnet, in the work referred to, reckons four thousand and sixty-one muscles in this caterpillar. We allow ourselves to be misled in supposing that animals, either of minute size or low in the scale of arrangement, exhibit any neglect or imperfection. Even if they were more simple in structure, the admiration should be greater, since they have all the functions in full operation which are necessary to life.—Sir C. Bell.

THE USEFUL ARTS AND MANUFACTURES OF GREAT BRITAIN.

HISTORICAL NOTICE OF CALICO PRINTING.

The ancients seem to have been well acquainted with the art of producing a coloured pattern on cloth. Homer, who wrote about nine hundred years before the Christian era, notices the variegated linen cloths of Sidon as magnificient productions. In India the art has been practised for ages, and it derives its English name of *Calico Printing* from *Calicut*, a town in the province of Malabar, where it was formerly carried on extensively. Herodotus, who wrote more than four hundred years before the Christian era, says, that "the inhabitants of Caucasus adorned their garments with figures of animals, by means of an infusion of the leaves of a tree, and the colours thus obtained were said to be very durable." Pliny describes the art of calico printing, as practised by the ancient Egyptians. He says:—

"An extraordinary method of staining cloths is practised in Egypt. They there take white cloths, and apply to them, not colours, but certain drugs which have the power of absorbing or drinking in colour; and in the cloth, so operated on, there is not the

smallest appearance of any dye, or tincture. These cloths are then put into a cauldron of some colouring matter, scalding hot, and after having remained a time are withdrawn, all stained and painted in various colours. This is indeed a wonderful process, seeing that there is, in the said cauldron, only one kind of colouring material. Yet, from it, the cloth acquires this and that colour, and the boiling liquor itself also changes, according to the quality and nature of the dye-absorbing drugs which were at first laid on the white cloth. And these stains or colours, moreover, are so firmly fixed as to be incapable of being removed by washing. If the scalding liquor were comprised of various tinctures and colours, it would doubtless have compounded them all in one on the cloth; but here one liquor gives a variety of colours according to the drugs previously applied. The colours of the cloths thus prepared are always more firm and durable than if the cloths were not dipped into the boiling cauldron." Mr. Parnell remarks on the above passage, that in as few words the principle of the common operations of calico printing could hardly be more accurately described.

The large cotton chintz counterpanes, called *Pallampoors*, which have been made in the East Indies from a very early period, are also prepared by the application of dye-absorbing drugs; certain parts of the cloth being guarded from the action of the dye by a coating of wax. The primitive methods of India are, however, being superseded by the printing machinery of Great Britain.

When Cortez conquered Mexico, he found the inhabitants had garments with black, red, yellow, green, and blue figures. The North American Indians have also long known how to apply patterns in different colours to cloth.

During several centuries the art of calico printing was practised in Asia Minor and the Levant, but it was scarcely known in Europe till the close of the seventeenth or the beginning of the eighteenth century, when Augsburg became celebrated for its printed cottons and linens. From that city the manufactures of Alsace and Switzerland, during a long period, obtained their colour mixers, dyers, &c. Calico printing was first introduced into England about the year 1676, by a Frenchman, who established works on the banks of the Thames near Richmond. Soon afterwards more extensive works were formed at Bromley Hall in Essex. About the year 1700, the infant art received an unexpected stimulus. In consequence of the complaints made by the silk and woollen weavers, an Act of Parliament was passed, prohibiting the importation of chintzes from India; whereupon several print-works were established in Surrey, to supply the London shops with these goods, which was done by printing the white Indian calicoes, the import of which was still allowed under a duty. In 1712, a duty of threepence per square yard was imposed on this printed calico, and in 1714 the duty was raised to sixpence; but, as the importation of white calico was still considerable, the complaints of the silk and woollen weavers became louder, and they actually succeeded in inducing the legislature, in 1720, to pass an Act prohibiting the wearing of all printed calico whatever, under a penalty of 5*l.* for each offence on the wearer, and of 20*l.* on the seller of a piece of calico.* The operations of the printer were consequently confined to the printing of linen until the year 1730, when the law was so far modified that calico was allowed to be printed, provided the warp was of linen yarn and the weft only of cotton; and even then it was subject to a duty of sixpence per square yard. With such obstructions the progress of the art was of course slow. In the middle of the last century only fifty thousand pieces of the mixed cloth were printed in the whole of Great Britain, whereas at the present time it is not unusual for a single manufactory to turn out, in one year, between three and four hundred thousand pieces.

About the year 1774, when the inventions made or perfected by Arkwright had introduced a new era into the history of the cotton manufacture

* Anderson's *History of Commerce*. By an Act of the same year (7 George I.), intended to encourage the silk manufacture, the wearing of buttons or botton-holes made of cloth, or other stuff, was absolutely prohibited.

a law was passed, allowing printed goods made entirely of cotton to be used; subject, however, to a duty of threepence per square yard, which was raised, in 1806, to threepence halfpenny. During many years attempts were made to get this duty repealed; for, although the nominal revenue produced by it was very large, yet after deducting drawbacks on exports, and the expenses of collection, a very small sum remained. Thus, in the year 1830, a revenue of 2,280,000*l.* was levied upon 8,596,000 pieces, of which, however, about three-fourths were exported with a drawback of 1,579,000*l.* Deducting the expenses of collection, the sum of 350,000*l.* only found its way into the Exchequer. In the year 1831, the duty was wholly repealed, to the great advantage both of manufacturer and consumer. The art itself has been wonderfully improved by many of the most refined applications of chemical and mechanical science. Printed goods, which fifty years ago were sold for two shillings and threepence the yard, may now be bought for eightpence; indeed, the materials for a very pretty gown may be purchased for two shillings. This cheapness of production has so much increased the demand for printed cotton goods, that it was calculated a few years ago that not less than 230,000 persons were employed in and dependent upon the print trade for subsistence, receiving in wages the annual sum of 2,400,000*l.*

VARIOUS MODES OF CALICO PRINTING.

The union of mechanical and chemical science is most strikingly illustrated in the details of calico printing; the object of which is to apply one or more colours to particular parts of cloth, so as to represent a pattern of leaves, flowers, &c. The beauty of a *print* depends on the brilliancy and contrast of the colours, as well as on the elegance of the pattern. The process is equally applicable to linen, silk, worsted, and mixed cloths, although it is usually referred to cotton cloth, or calico.

There are various methods of printing, which will be described in the order of their simplicity, in doing which the writer has to acknowledge the kindness of Mr. Joseph Lees, jun., of Manchester (from whose printworks much of the following information, as well as the sketches for the illustrations, were obtained); and also Mr. Parnell's valuable work, "Applied Chemistry in Manufactures," &c.

I.—BLOCK PRINTING BY HAND.

The simplest and earliest method of imprinting figures upon calico is by means of a wooden block, upon the face of which the design is cut in relief, as in an ordinary wood-cut.

CALICO-PRINTING BLOCK.

The block is of sycamore, holly, or pear-tree wood, or more commonly of deal, faced with one of these woods The block varies in size from nine to twelve inches long, and from four to seven inches broad, and it is furnished on the back with a strong handle of box-wood. When the design is complicated, and a very distinct impression is required, the figure is sometimes formed by the insertion of narrow slips of flattened copper wire, the interstices being filled with felt.

The printing block, which is worked by hand, is charged with colour by pressing it gently upon a piece of superfine woollen cloth, called the *sieve*, stretched tightly over a wooden drum, which floats in a tub full of size or thick varnish, to give it elasticity, so that every part of the raised device may acquire a sufficient coating of colour. The sieve is kept uniformly covered with the colouring matter by a boy or girl, called the *tearer*,* who takes up, with a brush, a small quantity of the colour contained in a small pot, and distributes it uniformly over the surface; for, if this were not done, the block would take up the colour unequally.

The calico is prepared for printing by *singeing*, *bleaching*, and *calendering*. Several pieces are then stitched end to end, and lapped round a roller, or arranged in folds, as shown in the cut. The printing shop is a long well-lighted apartment, the air of which is kept warm, for the purpose of drying the cloth as it is printed: for which purpose it is passed over hanging rollers,

* Probably a corruption from the French *tireur*.

Block Printing.

so as to expose a large surface to the air. The printing table, which is about six feet long, is made of some well-seasoned hard wood, such as mahogany, or of marble, or flag-stone: the object being to present a perfectly flat hard surface. This table is covered with a blanket, upon which the calico is extended, and the block, being charged with colour, is applied to its surface, a blow being given with a wooden mallet to transfer the impression fully to the cloth. It is necessary, of course, to join the different parts of the design with precision; and, in doing so, the printer is guided by small pins at the corners of the block. Thus, by repeated applications of the block to the woollen cloth and to the calico alternately, the whole length of calico is printed.

By this method, a single block prints only a single colour; so that if the design contain three or more colours, three or more blocks will be required, all of equal size, the raised parts in each corresponding with the depressed parts in all the others: in order, therefore, to print a piece of cloth twenty-eight yards long and thirty inches broad, with three blocks, each measuring nine inches by five, no less than 672 applications of each, or 2,016 applications of the three blocks, are necessary. Thus it will be seen that printing by hand is a tedious operation, requiring more diligence than skill.

When the design, however, consists of straight parallel stripes of different colours, they may be applied by one block at a single impression. For this purpose the colours are contained in as many small tin troughs as there are colours to be printed. These troughs are arranged in a line, and a small portion of each colour is transferred from them to the woollen cloth by a kind of wire brush. The colour is distributed evenly in stripes over the surface of the sieve by a wooden roller covered with woollen cloth. For the *rainbow style*, as a peculiar pattern is called, the colours are blended into one another at their edges by a brush or rubber.

An important improvement has been made in the construction of hand blocks, by the application of a stereotype plate as the printing surface. A small mould is produced from a model of the pattern, and the stereotype copies are then made by pouring *mixed metal* into it. A number of the stereotype plates are then formed into a printing block, by being arranged in a stout piece of wood.

(*To be continued.*)